International Automotive Components

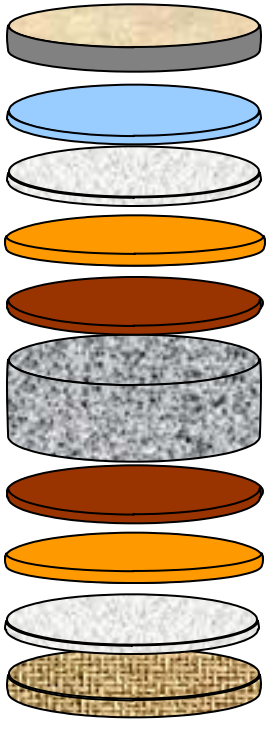
1905 Beard Street

Port Huron, Michigan

UROCORE PROCESS FLOW DIAGRAM AND PHOTOGRAPHS

Urocore Substrate

Cover and composite molded together in 1 step
Low weight
Low Cost
Moderately formable material
Moderate acoustic performance



Foam backed Knit Cover Materials or
Non Woven Materials
PE Film or Web adhesive
Glass Chopped
Catalyst
Urethane Adhesive
IAC Urethane Box Pour Foam
Urethane Adhesive
Catalyst
Glass Mat
Scrim

1 Step

Urocore Process Flow

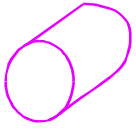
Stage 1-Load
Manual Load Urethane Sheet

Stage 2-Roll Coat
Urethane adhesive
application

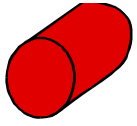
Stage 3-Composite
spray catalyst guns
chopped top glass
saw cut to length

Stage 4-Mold
Heated tool
Hydraulic 50T to 80T

Stage 5-Final Trim
water jet trim
Fanuc Robotics
55,000 psi
.007 orifice size


= Roll Goods
Scrim Backing with Fiber Glass
(Catalyst Sprayed)


=Roll Goods
Adhesive Film
Or Web films


=Roll Goods
Cover Material


=Formed Headliner
Final Trim

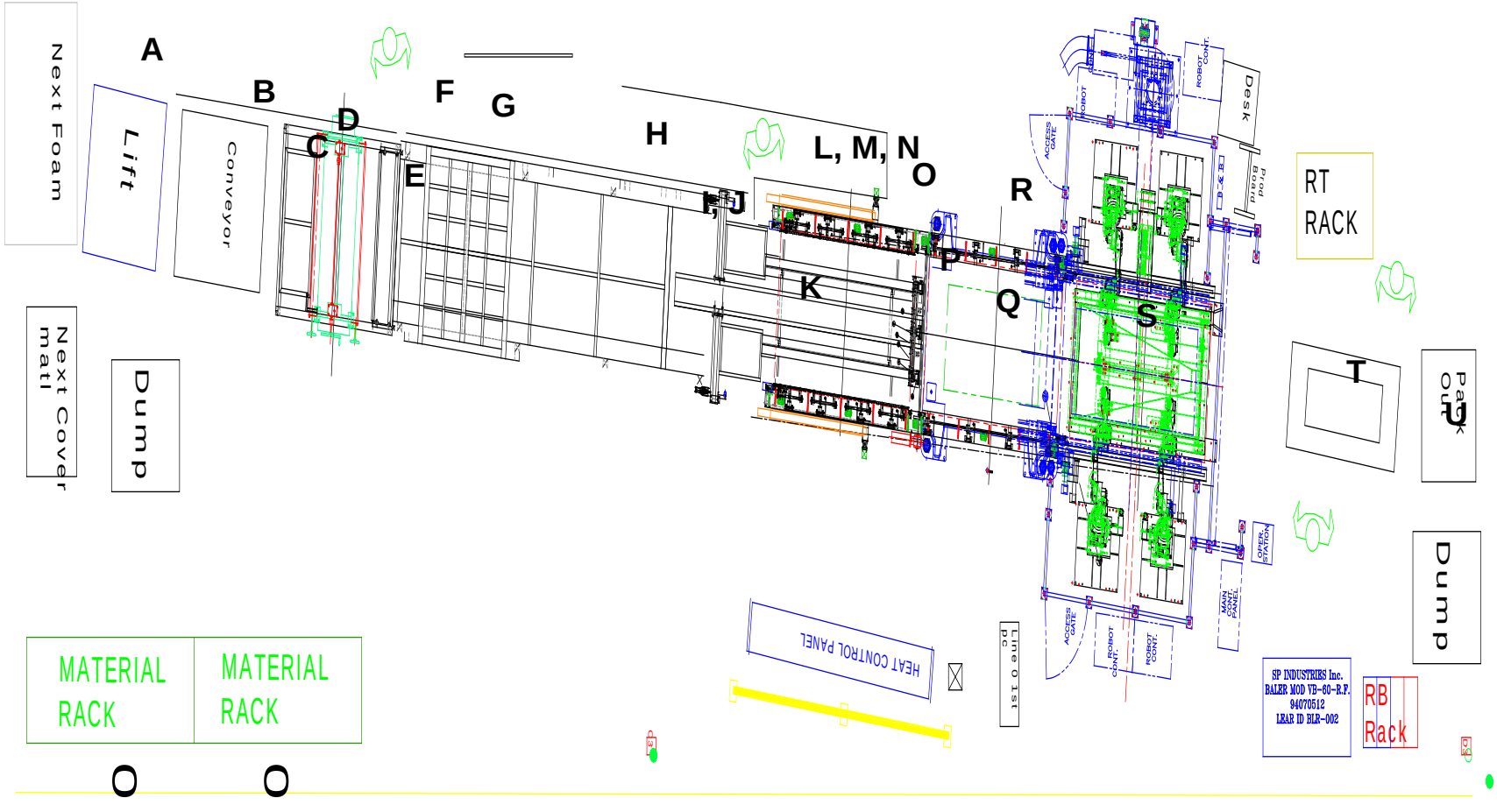

= IAC Box Pour Foam
at the Start of the Process


= Urethane Foam Core
with roll coated adhesive

Urocore Process – Line 0

Photo locations identified by letter

LINE 00



Stage 1

A. Stack of foam on lift at start of line.

Stage 1

B. Foam is manually placed on conveyor to run through the roll coater where MDI adhesive is applied.

** This photograph shows the MDI adhesive application roller position during operation.

Stage 2

C. Roll Coater – Adhesive is applied to foam via roll coater. The MDI adhesive is fed to the rollers through a supply at either end of the roller. Detail of the MDI supply is in the next set of photographs.

** These photographs show the MDI adhesive application roller position during times when the equipment is out of operation.



Stage 2

D. These photographs show how the MDI adhesive is transferred to the application rollers. MDI adhesive is pneumatically pumped to the transfer nozzle and a stream of MDI adhesive is applied to either end of the application rollers. There are two transfer nozzle per roller and two application rollers per line (top application roller and bottom application roller). The transfer nozzle is located on the upper right hand side of the picture on the left. The picture in the middle shows the same equipment from a different angle. The transfer nozzle in that picture is on the right hand side, nearly out of the shot. The picture on the right shows the stream of MDI flowing form the applicator onto the roller.

Stage 2
E. Foam exiting roll coater. The bottom of the foam is spray with catalyst as it exits the roll coater. The foam is mated with scrim after the catalyst has been sprayed on the foam.

Stage 2
F. Catalyst application to the bottom of the product.
** Photograph showing how the catalyst is sprayed onto the bottom of the product.

Stage 3

G. Side view. Rolls of glass mat and scrim sit under the conveyor. Start of Stage 2 is to the right. Catalyst is sprayed onto the bottom of the foam just prior to the point where the materials from these rollers are mated to the foam.

Stage 3

H. Conveyor belt looking from roll coater to top catalyst box and fiberglass choppers.

Stage 3

I. Catalyst box. Catalyst is sprayed onto the top of the foam inside this box. The white pipe is the 500 cfm air pick up for worker comfort.

Stage 3

J. Inside view of catalyst box. Catalyst spray nozzles are located along width of conveyor. **Photograph showing how the catalyst is sprayed onto the top of the product.

Stage 3

K. View of mezzanine where rolls of fiberglass strand are stored. Strands are funneled to the line and fed to the chopper box. The chopped fiberglass strands are applied to the top of the foam just after the catalyst is applied to the top of the product.

Stage 3
L. Fiberglass strands are fed to the chopper box.

Stage 3
M. Chopped fiberglass strands falling onto part.

Stage 3
N. Rolls of film and cover material. Product exits the fiberglass strand chopper box and is mated with film and cover material.

Stage 3
O. Cutting station. Cover material has been mated to part and requires cutting to part size.

Stage 3 to Stage 4
P. Conveyor from cutting station to heated press.

Stage 4
Q. Part goes into press and gets molded to shape.

Stage 4

R. Side view of press. Press is in "down" position molding part. **Photograph showing how the heated press molds the foam.

Stage 5

S. Robotic water jets cut out appropriate areas to ready part for assembly.

Stage 5
T. Employees removing slugs (cut outs) from parts prior to being packed out to assembly.

Stage 5
U. Pack out. Finished part is placed in a rail for shipment.